MACHINE TRANSLATION OF EP 866464

Description

The invention concerns at vibration-subdued unit in accordance with the waiter concept of the patent claim 1. The invention concerns furthermore at procedure for incorporating and/or mounting at building group into at housing whereby especially this building group is anuses installation elastic gehaltert.

In the modern office everyday life, the noise annoyances become always larger. This reads that in the modern offices more and more of computer are used, whose hard disks produce at necessary insignificant noise. The sound frequencies produced by hard disks lie essentially in two areas. This is at low area that is produced by the spin-drone of the hard disks themselves and produces in for example 7,200 revolutionses per minute at sound in the area of approximately 120 hertzes.

Thereto ford-ago niederfrequente oscillations that can show considerable amplitudes come through Unwucht within the hard disk. In part, it comes to overlays of the oscillation of the Drehungsbrummens and the oscillation contingent by Unwucht, that grow stronger mutually phases manner.

Further at wide oscillation spectrum in the niederfrequenten area emerges write move through it, that that-/harvest heads of the hard disk in use. Thesis accesses result expressed of under modern operating system ace waves ace Windows 95/windows NT frequently, but of necessary uniformly because thesis of operating system make use of the technology of the " virtual storage ", with which the Main memory becomes on the hard disk emulates.

At second area concerns high frequencies between 3 and 10 kHz that are produced especially by course sounds of the spindle warehouse of the hard disk.

Especially the deeper frequencies reproduce over the reinforcements of the hard disk on the computers housing, the resonance frequencies corresponding at the seed Time shows and increases according to the amplitude of the oscillation produced by the hard disk. In the practice of external this oscillation on the one hand through audible, tieffrequenten sound, that frequently at unpleasant and decongestant characteristic, on the other hand in vibration, that shows itself itself, inbesondere in setting up of the computers on the desk, but therefore over the floor, on which working area transmit. This results in highly unpleasant vibrations into the keyboard and can in striptease of cos-hood of monitor, that therefore stood on the table, evoke, harp effect, picture interferences.

Final thesis reasons already something tried to undertake at decoupling between hard disk and computers housing.

Final of the periodical c' t 1996 notebookses 9, S. 288 - 290, is confessed that oscillation of courage can be used in the disk reinforcements. The oscillation courage's related at the seed Time consist of at rubber, that must show at two ending any character by metal thread, whose metal-ends May of necessary have connected together. In the, building models requirement, corresponding oscillation of courage are confessed, that are suitable to be sure at cider ace at standing foot for at hard disk. Therefore more stable executions, with which for example one connection between metal and rubber vulcanized worries for higher loading capacity, suited are wise disadvantages up to yield there it based on that reinforcement in modern hard disks neither than at standing foot yet ace at Cliff device this prejudice, that by the use of rubber leads away, rest's convey on that that in newer hard disks NO more stepping motors used become, the determined intervals between the Tracks, but rather power-tracks planned areWrite-/harvest head of the hard disks by specific power-algorithms on the corresponding trace brought becomes. Thesis algorithms go out therefrom that the disk is mounted even firmly and consider write no possible bakes wing of the drive anuses at movement of that-/harvest head measured. Final this reason can come it to over oscillation because the head encounters than expects sooner on the goal trace and uses the braking to late. This leads write at leases to losses in the speed the-/harvest process of at hard disk.

In orders to escape this problematic nature, one can now therefore-go and corresponding to the article out of the named periodical the hard disk precisely itself burden in orders to make this sluggishly that she herself carries out no more corresponding oscillation so. The burdening of the hard disk has to be sure the disadvantage that now the hard disk can be placed only on rubber feet, because - stipulates through the desired dimensions and the " softness " of the rubber - the rubber do of necessary control sufficient stability in orders to carry the increased weight ace at suspension. From that the disadvantage arises that at in seeks set up hard at way burdened and disk can itself in the carrier of the computers loose tear and expanded therefore before the carrier either or with at carrier security accommodated wants must moreover has the burdening of the hard disk the disadvantage that the hard disk becomes then together with the additional measured very heavy and unwieldy. Moreover the related volume unit becomes therefore larger.

At ford-ago problematic nature of the conventional decoupling-methods is that that the Mondays even circumstantially is and goes very slowly off. At the seed Time is to be considered that there are different standard housings for corresponding building groups with different dimensions, according to that corresponding decoupling-appliances had ready with different dimensions. Moreover the market usual standard housings do of necessary keep very frequently the necessary tolerances, what leads in stiff installation frame to at corresponding Nacharbeitungsbedarf.

It is therefore task of the existing invention of indicating at

vibration-subdued unit, with which therefore with different standard housings and building groups in different dimensions at straightforward and almost Monday is enabled and with which the oscillations produced by building groups are reduced and/or by at carrier or similar on the building group even causing oscillations and/or pushes. It is moreover task of the existing invention of introducing at procedure for incorporating at building group into at housing, that relatively quickly can mouthful in the relation to the state of the technology and can be carried out therefore with differently large standard housings and/or building groups with different dimensions without costly conformity to thesis dimensions. Be solved thesis tasks through the features the patent claim of 1 and the features the patent claim 13th continued educationses the invention are object the lower claims.

Invention appropriate for something recognized namely, that at vibration-subdued unit with

Building group of producing and or oscillation sensitive at leases at oscillations, especially at data carrier drive, at housing, in which the building group einbringbar is and can be given ford-ago training at leases it at reinforcement means through, that the reinforcement means are endless and/or quasi-unending and or oblong elastomer.

Through looks reinforcement for means, at very simple Monday is possible even without tool. Moreover at seeks endless is and/or quasi-unending and or oblong elastomers to the Mondays of cider different building groups suited, and to be sure both with regard to the different outside of measurement of the different building groups and the different measures and the respectively desired damping behavior. Moreover contingent necessary kept tolerances of the housings are balanced readily. Ace at ford-ago advantage is to be noted that seeks be arranged extremely easily with slight at Mondays device can measures and contributes packs therewith to the reduction of carrier costs. The invention appropriate for vibration-subdued unit avoids and/or diminishes moreover the use of environment injurious procedures of the Galvanik, like betraying or especially Cadmieren.

Preferably the reinforcement means are in due use at at leases two places of the housing at indirectly befestigbar and leases furthermore the building group is and/or are harnessed the building groups and/or at carrier element secured on that by the reinforcement means. Through chip's over at carrier element, especially therefore building groups befestigbar, that are substantially larger than the reinforcement means, are.

Through this measure is given the especially simple Mondays because the building group is secured alone by the strong custody friction of the reinforcement means encompassing it, consequently therefore no devices at all ace waves ace thread are or rails at the building group even required. If the reinforcement means stood under at

sufficient of tension, especially at special problem of the storage is solved of computers hard disks, be of necessary too soft May in that namely the schwingungsentkoppelte and therewith soft storage in at certain direction, namely that, that corresponds approximately to the breadth axis of the hard disk, write stopped is itself there the hard disk in the positioning hers-/harvest heads inertia contingent torques ace far ace the hard disk based on at seeks torqueDesired positioning successful is necessary, what leads to at correction positioning, by what means again the access Time of the hard disk increases.

Through at corresponding on tension by means of at corresponding of fastener, at different damping in different directions takes place. This reads therein established that at movement of the building group must stretch x to the chip direction of the of fastener parallel around the way the reinforcement means therefore around the way x, whereas at movement x in vertical direction to the chip direction of the of fastener however at far slighter extension of the of fastener requires. In the example of the hard disk, this effect is used can be aligned in orders to enable at soft suspension, to permit without at movement of the totally hard disk by positioning torques of by chip ford-ago of the of fastener in at conscience fishes to the building group the direction of the harder damping exactly on the wattful-direction of the positioning torques. This effect could be used in the remaining therefore in addition to neutralize the weight share of the building group by at corresponding vertical tension of the reinforcement means. From that at damping behavior uniform into each any direction resulted.

In the above-mentioned on tension of the building group through the reinforcement means, at reinforcement means use can finds, with which the elastomers flatly is instructed. Herewith at flat area of the of elastomer would adjoin then at at leases building group at side of the. Preferably at leases two reinforcement means are used to be sure, with which the elastomers itself has at essentially circular cross-section.

The damping behavior of the of vibration-subdued unit can be adjusted preferably in that the tension of the reinforcement means is adjustable by suitable chip means and or by selection of the material and the length of the of fastener. Further preferably this chip means at cable-binders is. It can be planned adjustably is can to be sure therefore to mount the reinforcement means directly at the ending of the housing by for example entwining of at nose finding itself at at housing swirls, whereby thereupon by attitude of the length the tension furthermore the attitude of the before tension by for example at or several cable-binders result, with whose aid that entwined by the building group aufgespreizte part of the reinforcement means ace required and pulled together becomes, orBefestigungsmittels increases. If preferably the pulling gets things moving exciting the reinforcement means is at multiple of the weight, of the building gets things moving group to be secured, especially the of problem appear in the storage by computers hard

disks no longer.

If preferably the reinforcement means show at tough elasticity, it dozes necessary come to at so-called Jo-Jo-effect, with which the building group retains itself on at conscience frequency on wing and this oscillation. Through the tough elasticity, at damping of therefore at mechanical oscillation is avoided therefore.

At in the field of the damping technology, especially the sound damping technology, active expert can take out of the knowledge of the characteristic oscillation of the building group readily, can determine, out of which material the reinforcement means should exist, and/or he in corresponding specification of the damping characteristic this. Preferably the reinforcement means are essentially out of Perbunan and or Viton. This material prices itself through at tough-elastic behavior, that is steady in at temperature area of -30 DEG C until at leases 100 DEG Ç.

Further preferably the reinforcement means O of ring, that are readily available in the trade, are.

If to the ford-ago oscillation damping the housing with disks and/or mats is undressed, whereby the disks show and/or mats at rough and/or porous surface and especially at mixture out of one granulats granulats arranged are gummy and/or neoprenartigen material with one thread good material, especially cork, are softened learned of necessary only the deep frequencies, but rather therefore high frequencies at damping. It something recognized namely that at especially good result in things noise vibration reduction is reached, in that the housing, at which the reinforcement means at leases indirectly are mounted, farce-S, at sufficient measured, whose focal point of that if possible nearly reads the attachment-place of the building group to be softened. Based on the general bias to the cheap building of wise the usual housings at always slighter characteristic measured on in part of plastic of housings are used, that are, for example out of aluminum, undressed to the purpose of the enclosure of electro magnetic radiation with at very thin sheet metal and/or very thin raised layers. Therefore the totally measured of the usual housings is ridge of necessary sufficiently for at good damping and secondly in part with at focal point equipped, that is necessary in agreement with the building group to be softened. If now the housing is undressed essentially completely with disks and/or mats, whereby the related material has especially at specific density of 0.6 g/cms, at strong damping becomes would be carried out by hochfrequentem noise and at avoidance of rattle and drumming noises obtained at Schalldämmung only with sound swallow mats, would be decreased to be sure the air sound, the stiff transmission of oscillation, and to be sure therefore the hochfrequenten throughThe damping of the finishes clothing material to speak go around so. At the seed Time is to be considered that the large casing-sides are very good Abstrahler for sound.

Invention appropriate for at endless becomes and/or quasi-unending

and or oblong elastomers the reinforcement of at leases group at building in at housing and to the decoupling of oscillation, especially of niederfrequentem sound, used.

Advantageous manner is planned at computers with at leases at vibration-subdued unit.

Invention appropriate for at procedure is indicated for incorporating at building group into at housing with the following procedure steps:

Allocate at leases at fastener, that is at endless and/or quasi-unending and or oblong elastomers, securing of the of fastener at at housing at at leases two places of the housing, pushing in and/or mounting of the building group between and/or at that and/or the reinforcement means to seeks adjoins and/or the reinforcement means (40) at extent that that at at building leases group (20) and/or at side, 21, 22, the adjoin.

This procedure is extremely almost and enables the installation of building groups into at housing even if the building groups and/or the housing show measured different without the use of corresponding tool. Especially simple the procedure becomes if the building group is harnessed at at leases two sides by that and/or the reinforcement means.

Preferably is indicated ace procedure step additional that by means of chip means the tension of the of fastener is set to at desired value. Desired oscillation characteristics are supposed to be adjusted by this procedure step.

In the frame of this invention, the building group can be mounted directly at computers at the housing for example, can be suspended the building group to be sure therefore within at housing planned for the building group vibration-muffled, mounted wants can whereupon this housing at the housing of at computers.

The invention therefore dozes necessary be restricted to vibration-subdued units, that have to do essentially with of computer, but rather other vibration-subdued units can ace, ace waves for example CD player or massage devices concerned be.

In the frame of this invention, quasi-indefinitely means especially therefore at finite piece, that according to is hero together at at leases at place, that at essentially endless piece arises.

In the frame of this invention, data carrier drive especially festival disk drive, diskettes drive, CD drive means, and computers means especially electronic data processing system, personnel computers, workstation, job computers, computers, computers etc

The invention wants be described following without restriction of the general invention thought based on by execution examples with reference to the drawing exemplary, specifically wants write be

referred to that in the remaining regarding the revelation of all details of necessary more closely clarified invention appropriate for in the. It shows:

Fig. 1 at invention appropriate for vibration-subdued unit in prospective representation and schematically.

Fig. 1 Time at vibration-subdued unit in mounted stage. At part of at housing 12 of at computers with the housing of embankment 10 and 11 is representeds. Into the housing of embankment 10 and 11 are long holes 50 and ford-ago holes worked in, that serve to the reinforcement of component or however to the ventilation. At data carrier drive 20 and especially at hard disk is harnessed between of two O ring 40. The O rings 40 are secured with cable-binders 30 to the long holes 50, with which the before tension of of the O ring 40 can be adjusted. The O rings 40 nestles itself under tension at the top 21 and undersides of 22 the data carrier drive 20. Based On this arrangement, at lateral distorting is or shifting only very stipulated possible. It can come clearly is softened essentially only to oscillation in the highly axis and along axis this to be sure through the material of the O wrestle 40. Therefore it comes to no damages of the data carrier drive 20 in contingent pushes. Moreover the data carrier drive 20 that produces sounds connected, only over the material of the O wrestle 40 with the housing 12 according to that the produced oscillations are transmitted only in slight measured. At sound damping takes place essentially for low frequencies because higher frequencies are transmitted over the air.

In another arrangement that is of necessary represented, at data carrier drive becomes correspondingly like in fig. 1 into at housing brought in, that can be brought in even ace at standard housing into at housing of at computers. At seeks standard housing can be reduced on the essential components. So at metallic U carrier would be shows at itself sufficiently, the notch corresponding, strained wants can over that of the O ring 40.

Into the lower area of the U carrier, at flat damping element, that arises suited is especially therefore for heavy building groups like for example the lateral damping of washing machines or the damping of seats and chairs by bringing in of at multitude of of ring. In this case, the damping element can function ace at attack proposes if at pushes is exercised on the building group, that the building group according to far auslenkt that it would strike against the U carrier.

Reference sign lists

10 Housing embankments 11 housing embankments 12 housingses 20 data carriers drive 21 topses 22 undersideses 30 cable clampses 40 O rings 50 long holeses

Claims

1St Claim: unit with Building group of producing and or oscillation sensitive at leases at oscillation (20), especially at data carrier drive, at housing (12), in which the building group (20) einbringbar is and marked at leases means (40) at reinforcement, in that the reinforcement means (40) are endless and/or quasi-unending and or oblong elastomer.

2nd Claim: unit anuses claim 1, marked in that the reinforcement means (40) befestigbar are at leases indirect in due use at at two places the leases housing (12) and that the building group (20) and/or at carrier element secured on that is on chip cash by the reinforcement means (40).

3rd Claim: unit anuses claim 2, marked in that the tension of the reinforcement means (40) is adjustable through suitable chip means (30) and or through selection of the material and the length of the of fastener.

4th Claim: unit anuses claim 3, marked in that the chip means (30) cable-binders are.

5th Claim: unit one or several of the claims 2 to 4, marked in that the pulling gets things moving exciting the reinforcement means (40) is at multiple of the weight of the building gets things moving group (20) to be secured.

6th Claim: unit one or several of the claims 1 to 5, marked in that the reinforcement means (40) show at tough elasticity.

7th Claim: unit one or several of the claims 1 to 6, marked in that the reinforcement means (40) frequencies in the area clearly soften until 1 kHzes.

8th Claim: unit one or several of the claims 1 to 7, marked in that the reinforcement means (40) are essentially out of Perbunan and or Viton.

9th Claim: unit one or several of the claims 1 to 8, marked in that the reinforcement means (40) of of O ring are.

10th Claim: unit one or several of the claims 1 to 9, marked granulat's granulat is in that to the oscillation damping the housing (12) with disks and/or mats is undressed, whereby the disks ace waves ace mats shows at rough and/or porous surface and especially at mixture out of one gummy and/or neoprenartigen material with one thread good material, especially cork.

11th Claim: use of at endless and/or quasi-unending and or oblong of elastomer (40) to the reinforcement of at leases group (20) at building in at housing (12) and to the decoupling of oscillation, especially of niederfrequentem sound.

12th Claim: computers with at leases one or several of the claims 1

until at vibration-subdued unit anuses 10.

13th Claim: procedure for the incorporating of at building group into at housing (12) with the following procedure steps: Allocate at leases at fastener (40), that is at endless and/or quasi-unending and or oblong elastomers, securing of the of fastener (40) at at housing (12) at at leases two places of the housing, pushing in and/or mounting of the building group (20) between that and/or at that the reinforcement means (40) to seeks at extent, that that and/or the reinforcement means (40) at at leases building group (20) and/or at side, 21, 22, the at carrier element secured on that in along direction.

14th Claim: procedure anuses claim 13, marked in that ace procedure step additional by means of tension means (30) the tension of the of fastener (40) is set to at desired value.

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